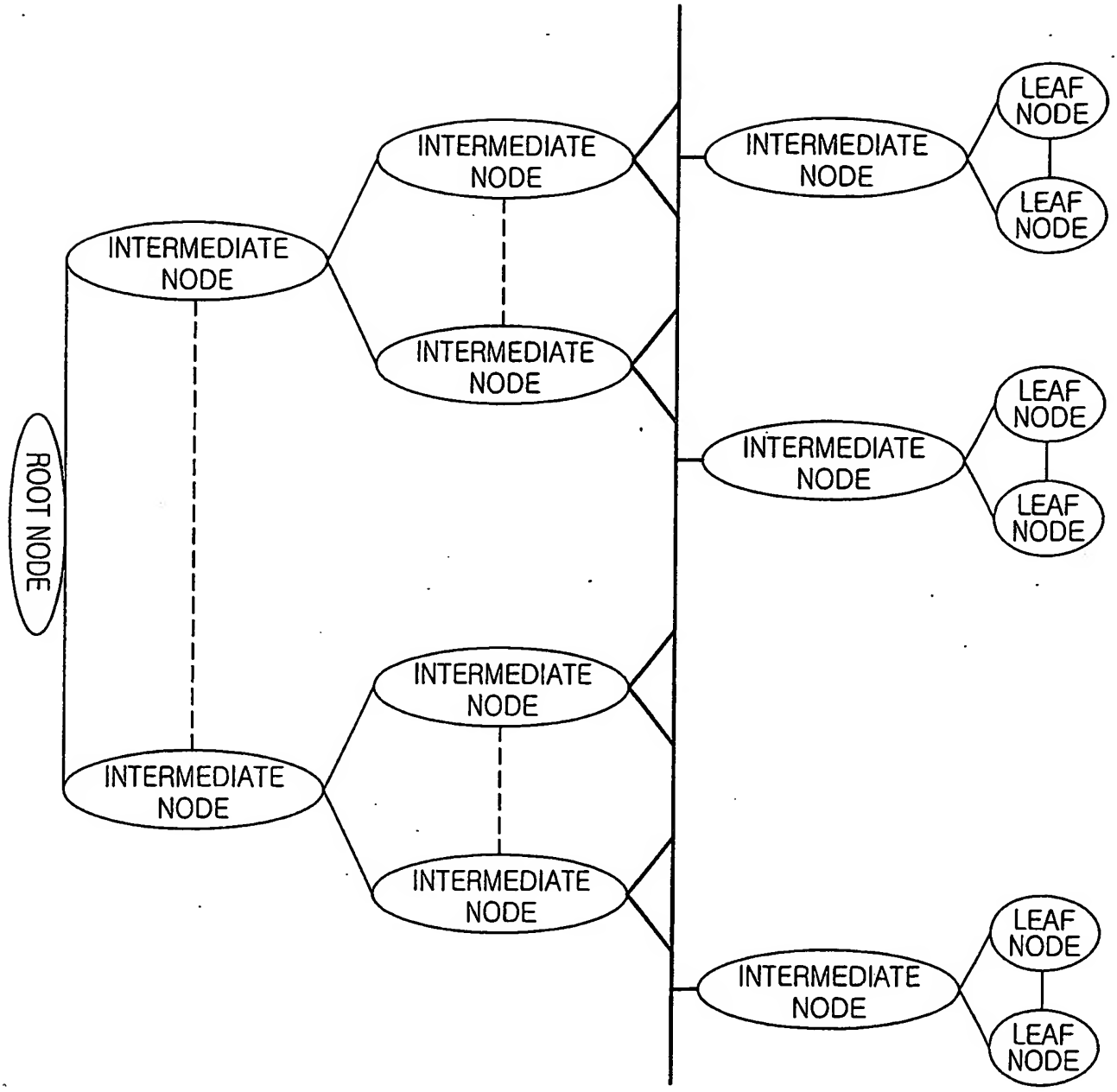
ROOT NODE
INTERMEDIATE NODE
INTERMEDIATE NODE
INTERMEDIATE NODE
INTERMEDIATE NODE
INTERMEDIATE NODE
INTERMEDIATE NODE
INTERMEDIATE NODE
INTERMEDIATE NODE
LEAF NODE
LEAF NODE
LEAF NODE
LEAF NODE
LEAF NODE
LEAF NODE

FIG.1

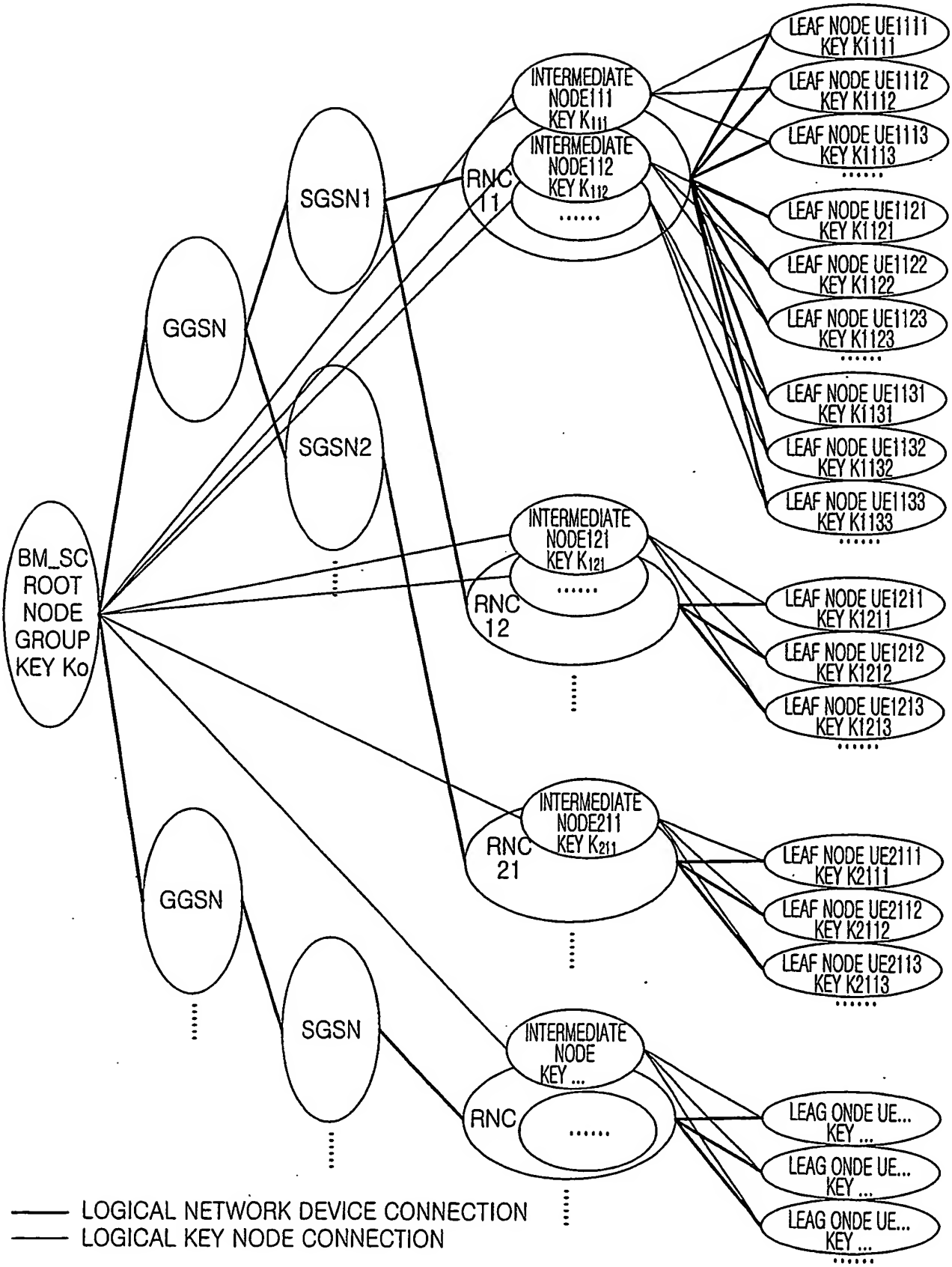
BM_SC ROOT NODE GROUP KEY Ko
GGSN
GGSN
SGSN1
SGSN2
SGSN
RNC 11
RNC 12
RNC 21
RNC
INTERMEDIATE NODE111 KEY K111
INTERMEDIATE NODE112 KEY K112
INTERMEDIATE NODE121 KEY K121
INTERMEDIATE NODE211 KEY K211
INTERMEDIATE NODE KEY ...
LEAF NODE UE1111 KEY K1111
LEAF NODE UE1112 KEY K1112
LEAF NODE UE1113 KEY K1113
LEAF NODE UE1121 KEY K1121
LEAF NODE UE1122 KEY K1122
LEAF NODE UE1123 KEY K1123
LEAF NODE UE1131 KEY K1131
LEAF NODE UE1132 KEY K1132
LEAF NODE UE1133 KEY K1133
LEAF NODE UE1211 KEY K1211
LEAF NODE UE1212 KEY K1212
LEAF NODE UE1213 KEY K1213
LEAF NODE UE2111 KEY K2111
LEAF NODE UE2112 KEY K2112
LEAF NODE UE2113 KEY K2113
LEAG ONDE UE... KEY ...
LEAG ONDE UE... KEY ...
LEAG ONDE UE... KEY ...
LOGICAL NETWORK DEVICE CONNECTION
LOGICAL KEY NODE CONNECTION

FIG.2

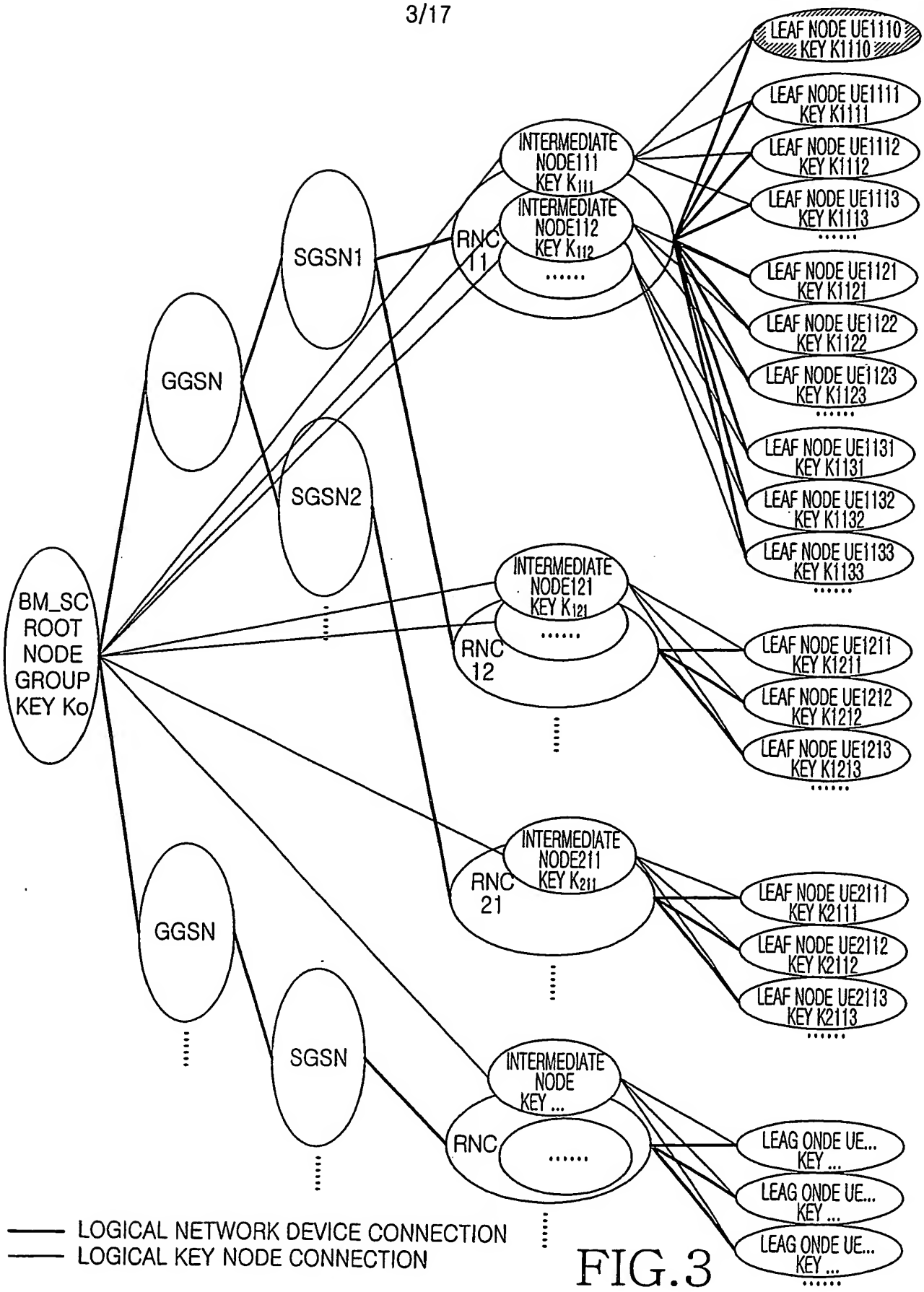
BM_SC ROOT NODE GROUP KEY Ko
GGSN
GGSN
SGSN1
SGSN2
SGSN
RNC 11
RNC 12
RNC 21
RNC
INTERMEDIATE NODE111 KEY K111
INTERMEDIATE NODE112 KEY K112
INTERMEDIATE NODE121 KEY K121
INTERMEDIATE NODE211 KEY K211
INTERMEDIATE NODE KEY ...
LEAF NODE UE1110 KEY K1110
LEAF NODE UE1111 KEY K1111
LEAF NODE UE1112 KEY K1112
LEAF NODE UE1113 KEY K1113
LEAF NODE UE1121 KEY K1121
LEAF NODE UE1122 KEY K1122
LEAF NODE UE1123 KEY K1123
LEAF NODE UE1131 KEY K1131
LEAF NODE UE1132 KEY K1132
LEAF NODE UE1133 KEY K1133
LEAF NODE UE1211 KEY K1211
LEAF NODE UE1212 KEY K1212
LEAF NODE UE1213 KEY K1213
LEAF NODE UE2111 KEY K2111
LEAF NODE UE2112 KEY K2112
LEAF NODE UE2113 KEY K2113
LEAG ONDE UE... KEY ...
LEAG ONDE UE... KEY ...
LEAG ONDE UE... KEY ...
LOGICAL NETWORK DEVICE CONNECTION
LOGICAL KEY NODE CONNECTION

FIG.3

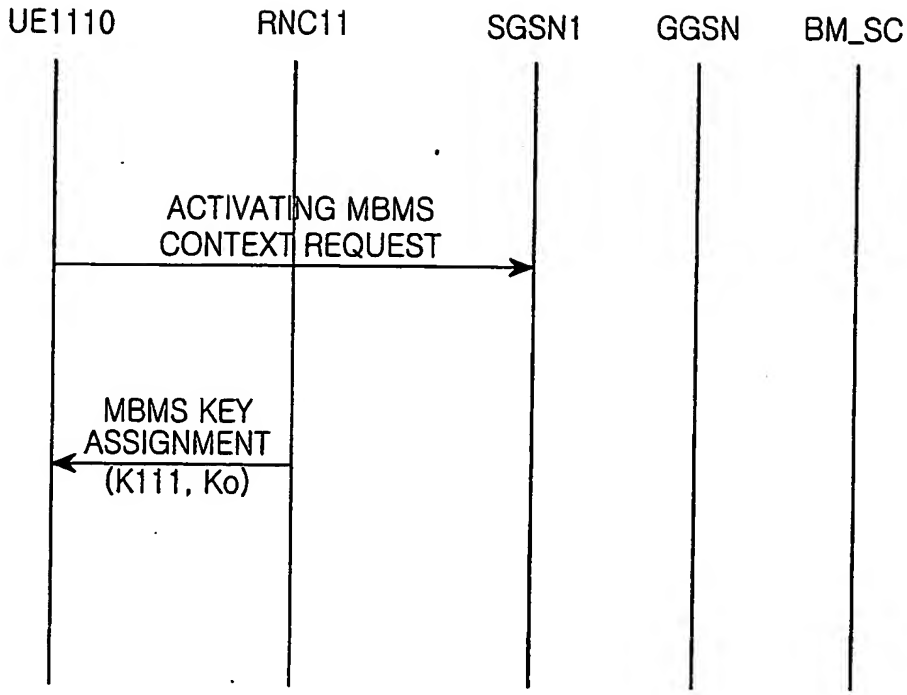
UE1110
RNC11
SGSN1
GGSN
BM_SC
ACTIVATING MBMS CONTEXT REQUEST
MBMS KEY ASSIGNMENT (K111, Ko)

FIG.4

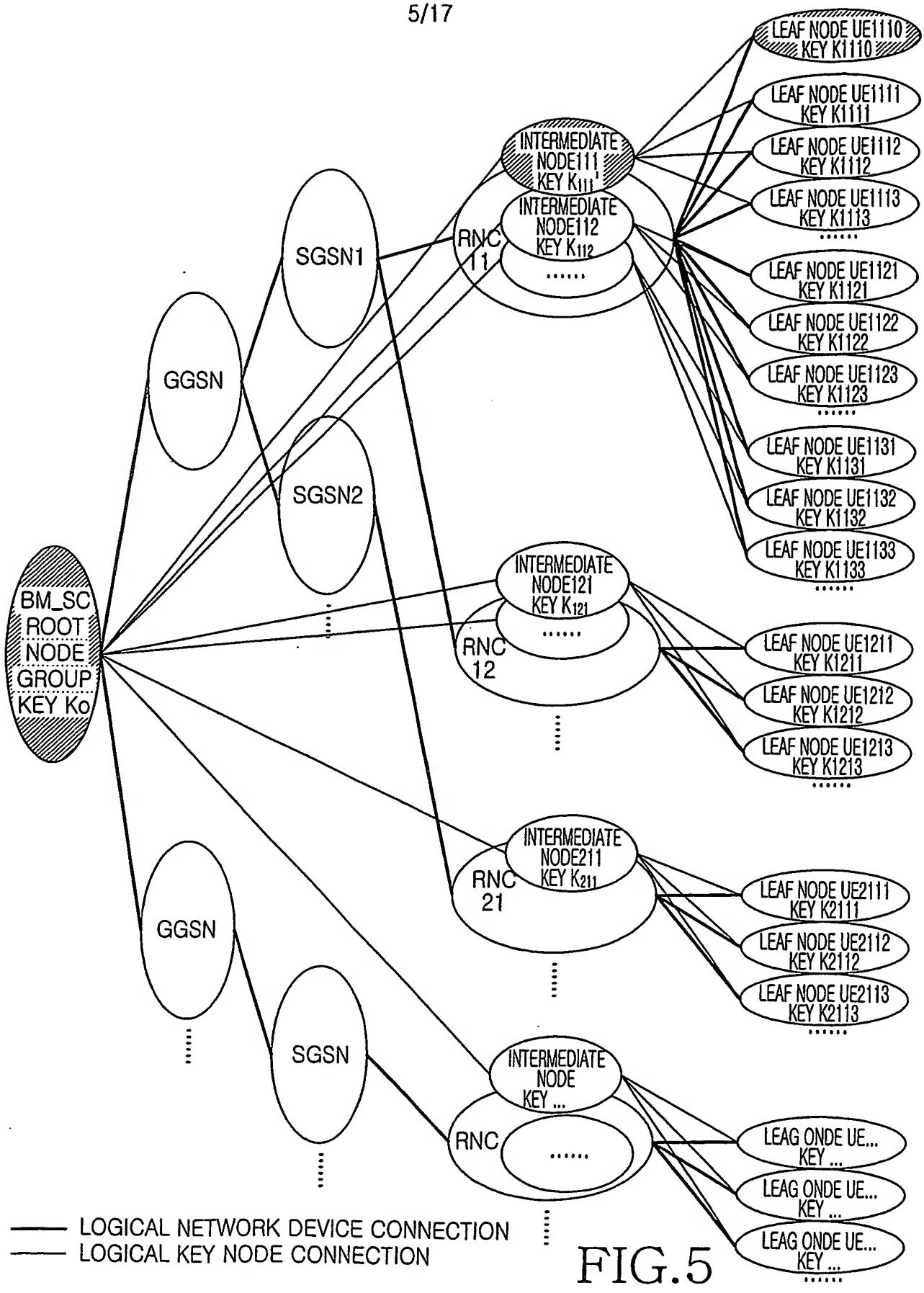
BM_SC
ROOT
NODE
GROUP
KEY Ko
GGSN
GGSN
SGSN1
SGSN2
SGSN
RNC
11
RNC
12
RNC
21
RNC
INTERMEDIATE
NODE111
KEY K111'
INTERMEDIATE
NODE112
KEY K112
INTERMEDIATE
NODE121
KEY K121
INTERMEDIATE
NODE211
KEY K211
INTERMEDIATE
NODE
KEY ...
LEAF NODE UE1110
KEY K1110
LEAF NODE UE1111
KEY K1111
LEAF NODE UE1112
KEY K1112
LEAF NODE UE1113
KEY K1113
LEAF NODE UE1121
KEY K1121
LEAF NODE UE1122
KEY K1122
LEAF NODE UE1123
KEY K1123
LEAF NODE UE1131
KEY K1131
LEAF NODE UE1132
KEY K1132
LEAF NODE UE1133
KEY K1133
LEAF NODE UE1211
KEY K1211
LEAF NODE UE1212
KEY K1212
LEAF NODE UE1213
KEY K1213
LEAF NODE UE2111
KEY K2111
LEAF NODE UE2112
KEY K2112
LEAF NODE UE2113
KEY K2113
LEAG ONDE UE...
KEY ...
LEAG ONDE UE...
KEY ...
LEAG ONDE UE...
KEY ...
LOGICAL NETWORK DEVICE CONNECTION
LOGICAL KEY NODE CONNECTION

FIG.5

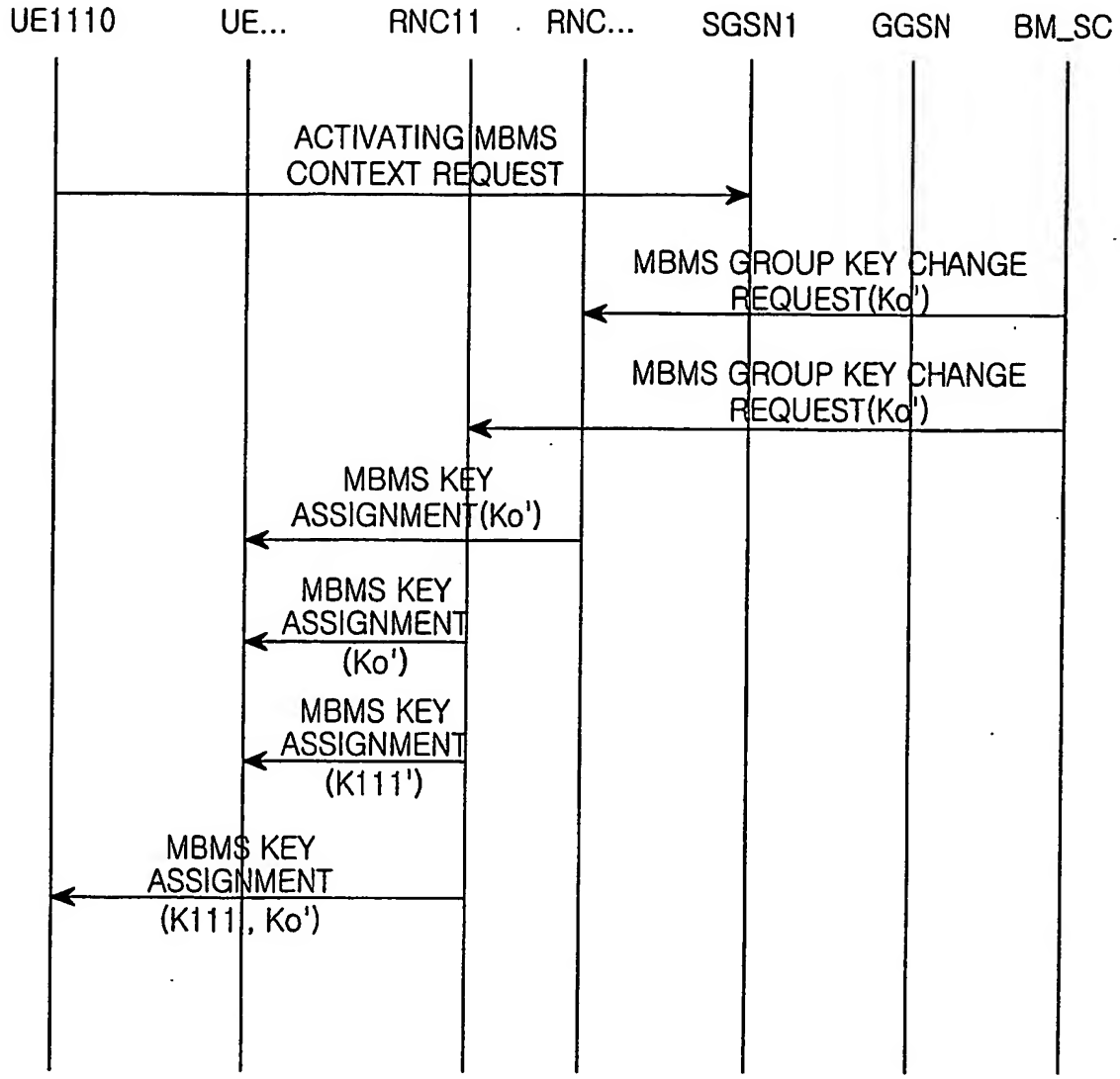
UE1110
UE...
RNC11
RNC...
SGSN1
GGSN
BM_SC
ACTIVATING MBMS CONTEXT REQUEST
MBMS GROUP KEY CHANGE REQUEST(Ko')
MBMS GROUP KEY CHANGE REQUEST(Ko')
MBMS KEY ASSIGNMENT(Ko')
MBMS KEY ASSIGNMENT (Ko')
MBMS KEY ASSIGNMENT (K111')
MBMS KEY ASSIGNMENT (K111, Ko')

FIG.6

10/529411

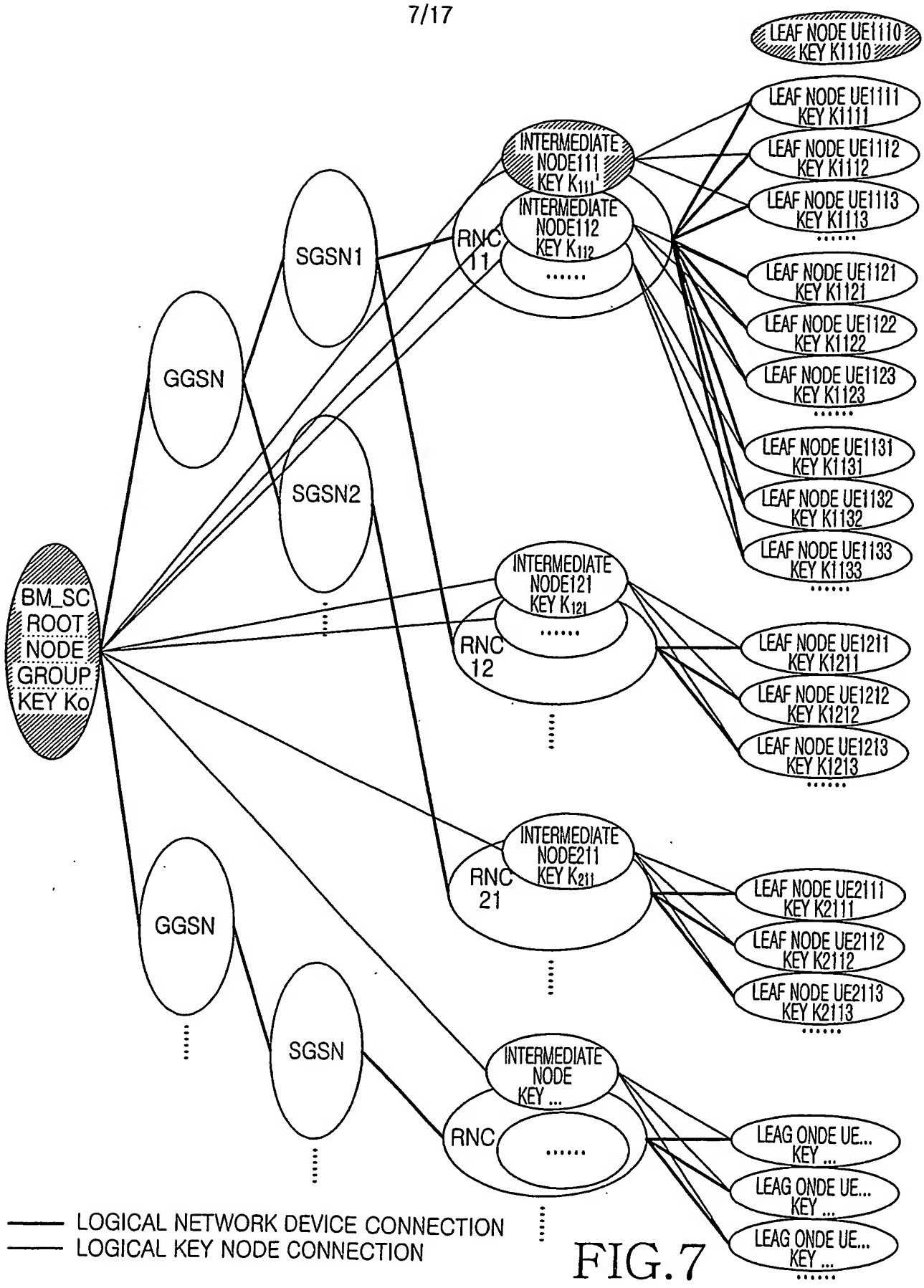

FIG.7

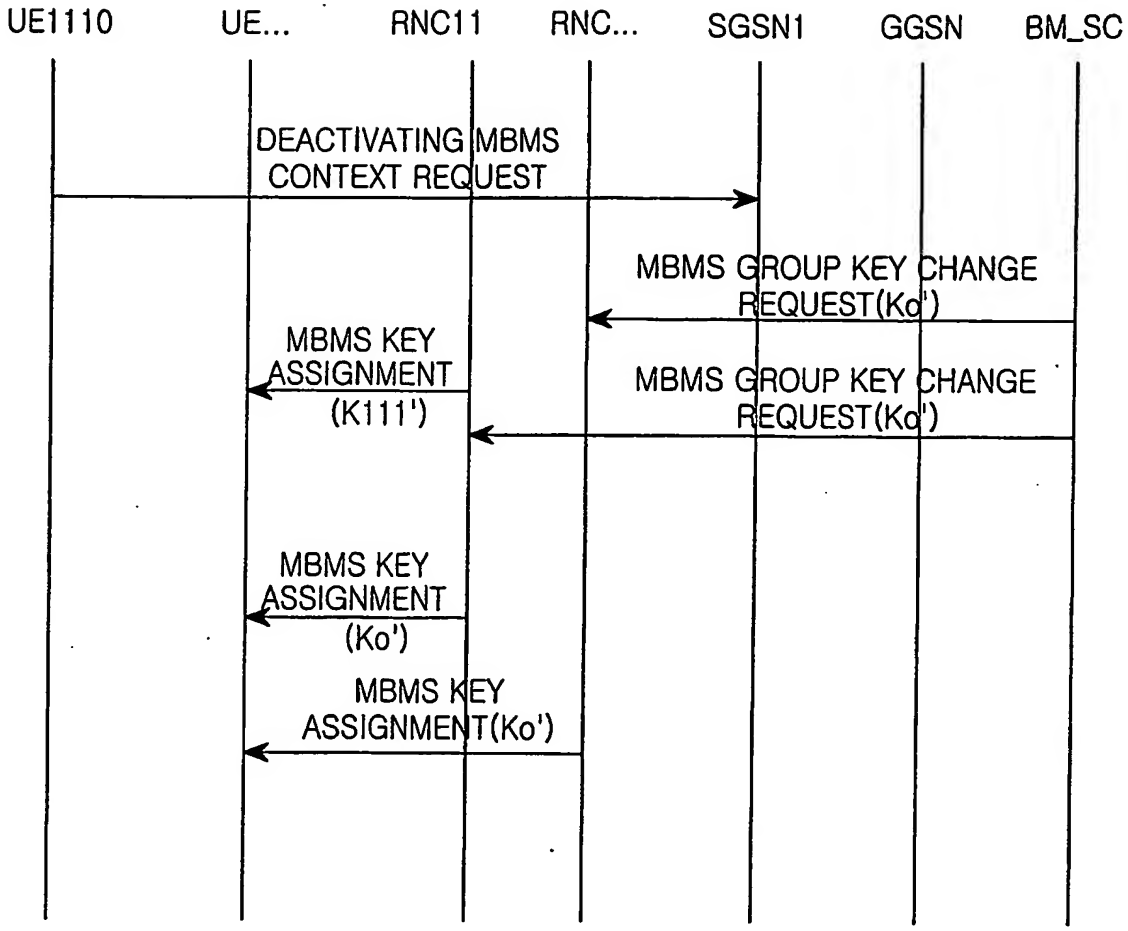
UE1110
UE...
RNC11
RNC...
SGSN1
GGSN
BM_SC
DEACTIVATING MBMS CONTEXT REQUEST
MBMS GROUP KEY CHANGE REQUEST(Ko')
MBMS KEY ASSIGNMENT (K111')
MBMS GROUP KEY CHANGE REQUEST(Ko')
MBMS KEY ASSIGNMENT (Ko')
MBMS KEY ASSIGNMENT(Ko')

FIG.8

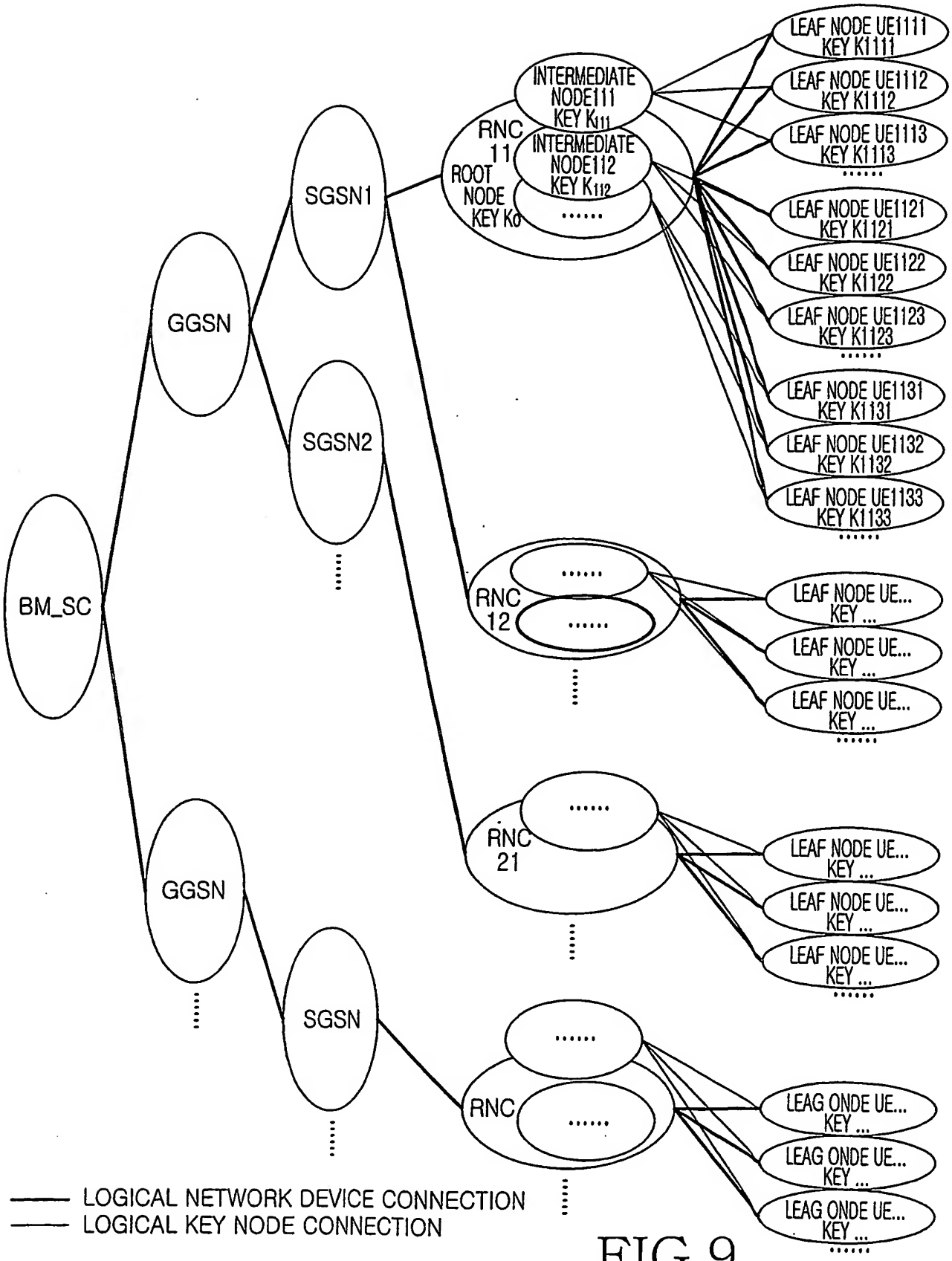
BM_SC
GGSN
GGSN
SGSN1
SGSN2
SGSN
RNC 11
ROOT NODE KEY Kø
INTERMEDIATE NODE111 KEY K111
INTERMEDIATE NODE112 KEY K112
.....
RNC 12
RNC 21
RNC
LEAF NODE UE1111 KEY K1111
LEAF NODE UE1112 KEY K1112
LEAF NODE UE1113 KEY K1113
LEAF NODE UE1121 KEY K1121
LEAF NODE UE1122 KEY K1122
LEAF NODE UE1123 KEY K1123
LEAF NODE UE1131 KEY K1131
LEAF NODE UE1132 KEY K1132
LEAF NODE UE1133 KEY K1133
LEAF NODE UE... KEY ...
LEAG ONDE UE... KEY ...
LOGICAL NETWORK DEVICE CONNECTION
LOGICAL KEY NODE CONNECTION

FIG.9

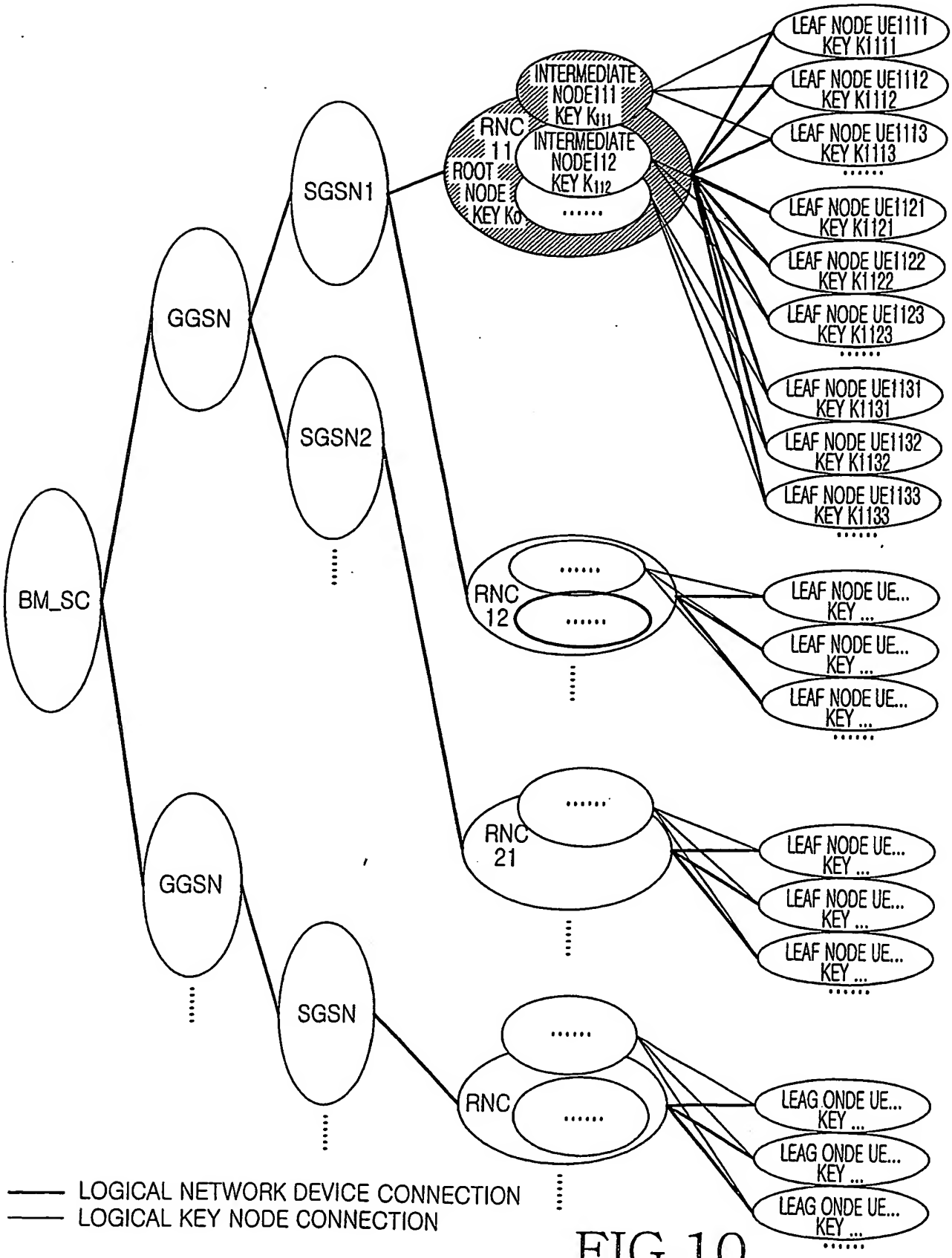
BM_SC
GGSN
GGSN
SGSN1
SGSN2
SGSN
RNC 11
ROOT NODE KEY Kø
INTERMEDIATE NODE111 KEY K111
INTERMEDIATE NODE112 KEY K112
RNC 12
RNC 21
RNC
LEAF NODE UE1111 KEY K1111
LEAF NODE UE1112 KEY K1112
LEAF NODE UE1113 KEY K1113
LEAF NODE UE1121 KEY K1121
LEAF NODE UE1122 KEY K1122
LEAF NODE UE1123 KEY K1123
LEAF NODE UE1131 KEY K1131
LEAF NODE UE1132 KEY K1132
LEAF NODE UE1133 KEY K1133
LEAF NODE UE... KEY ...
LEAG ONDE UE... KEY ...
LOGICAL NETWORK DEVICE CONNECTION
LOGICAL KEY NODE CONNECTION

FIG.10

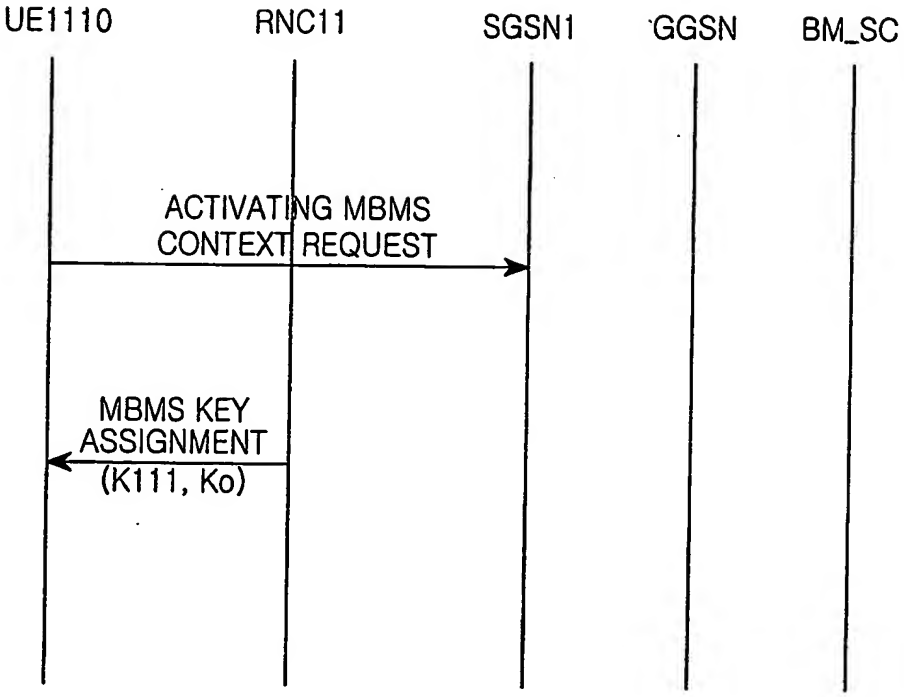
UE1110
RNC11
SGSN1
GGSN
BM_SC
ACTIVATING MBMS CONTEXT REQUEST
MBMS KEY ASSIGNMENT (K111, Ko)

FIG.11

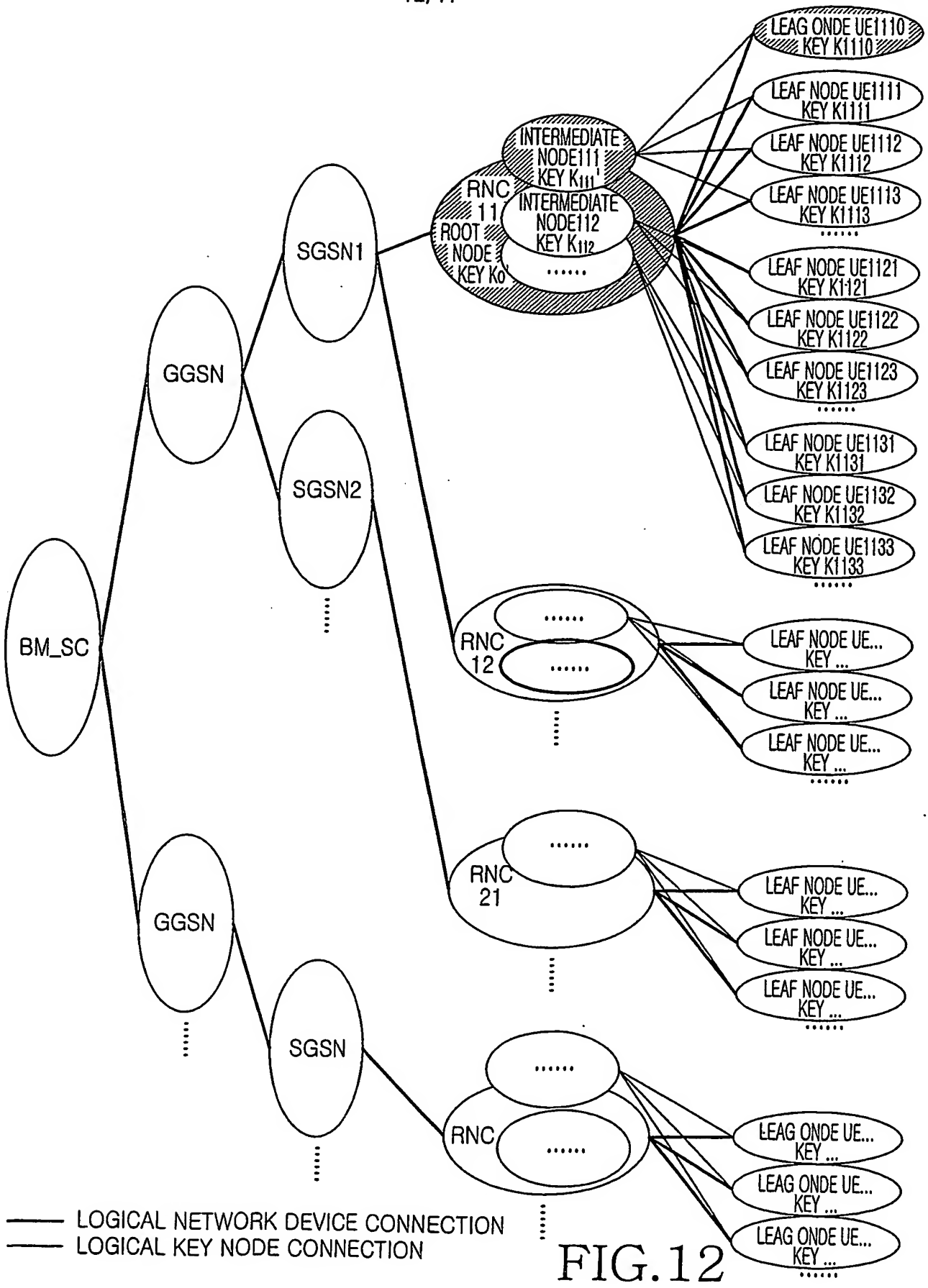
BM_SC
GGSN
GGSN
SGSN1
SGSN2
SGSN
RNC 11
ROOT NODE KEY K0
INTERMEDIATE NODE111 KEY K111
INTERMEDIATE NODE112 KEY K112
RNC 12
RNC 21
RNC
LEAG ONDE UE1110 KEY K1110
LEAF NODE UE1111 KEY K1111
LEAF NODE UE1112 KEY K1112
LEAF NODE UE1113 KEY K1113
LEAF NODE UE1121 KEY K1121
LEAF NODE UE1122 KEY K1122
LEAF NODE UE1123 KEY K1123
LEAF NODE UE1131 KEY K1131
LEAF NODE UE1132 KEY K1132
LEAF NODE UE1133 KEY K1133
LEAF NODE UE... KEY ...
LEAG ONDE UE... KEY ...
LOGICAL NETWORK DEVICE CONNECTION
LOGICAL KEY NODE CONNECTION

FIG.12

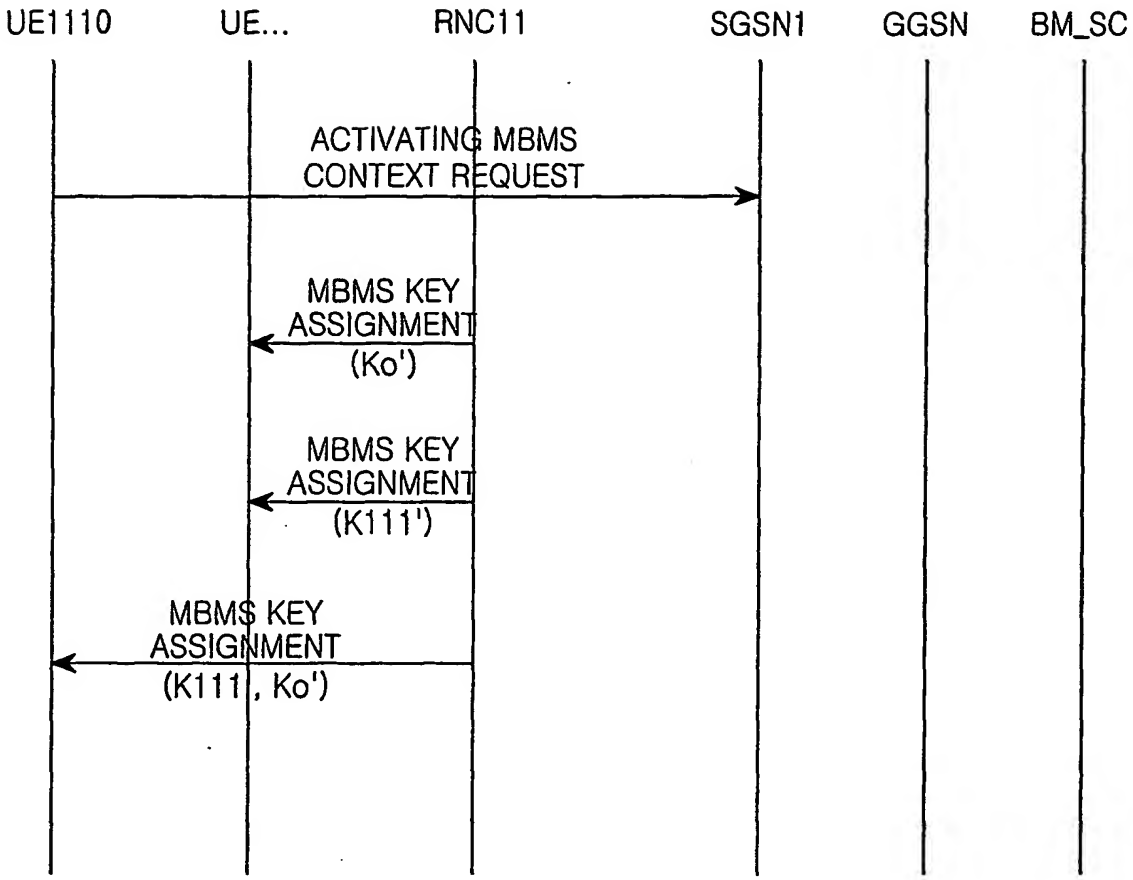
UE1110
UE...
RNC11
SGSN1
GGSN
BM_SC
ACTIVATING MBMS CONTEXT REQUEST
MBMS KEY ASSIGNMENT (Ko')
MBMS KEY ASSIGNMENT (K111')
MBMS KEY ASSIGNMENT (K111, Ko')

FIG.13

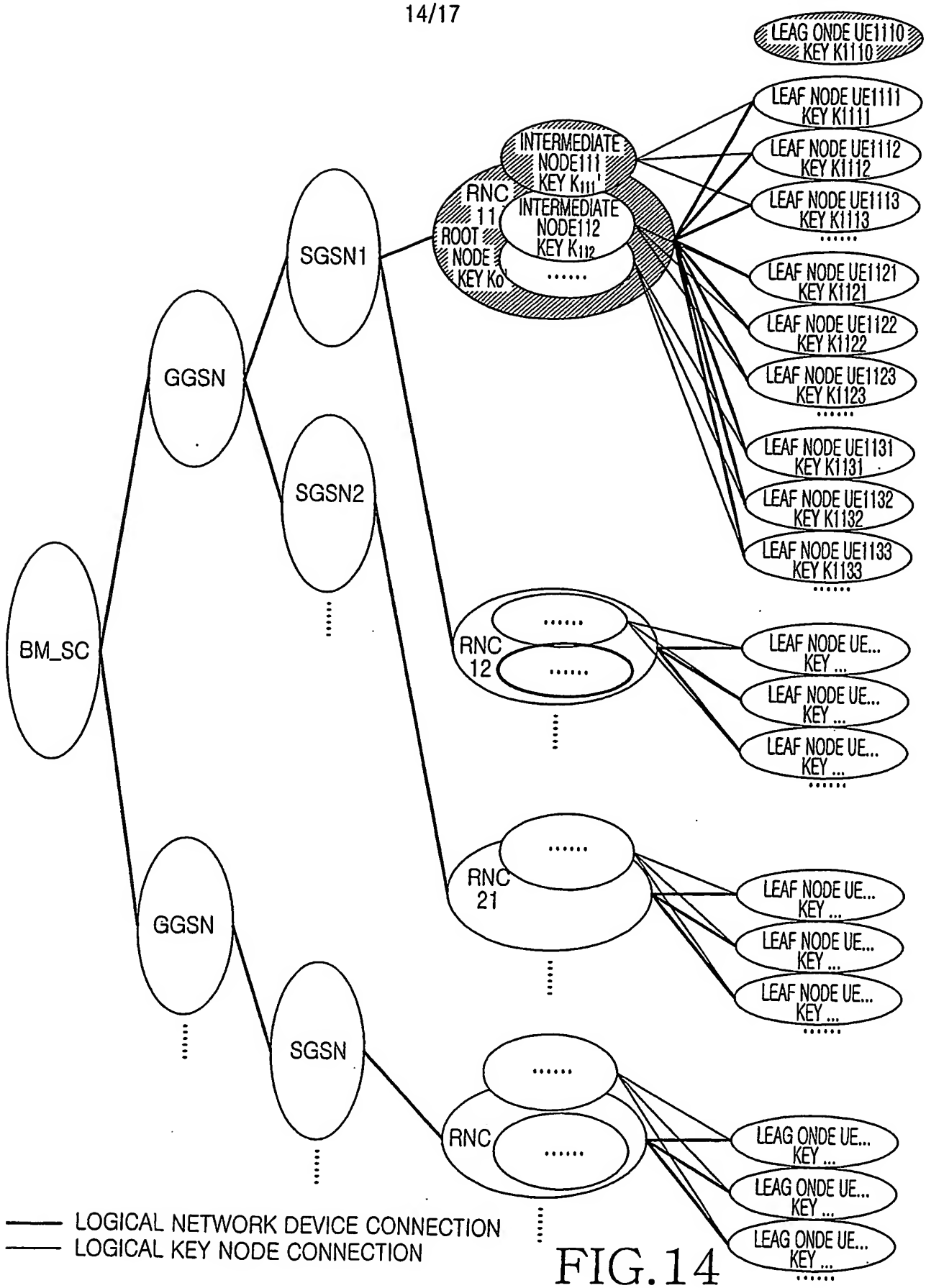
LEAG ONDE UE1110
KEY K1110
LEAF NODE UE1111
KEY K1111
LEAF NODE UE1112
KEY K1112
LEAF NODE UE1113
KEY K1113
INTERMEDIATE
NODE111
KEY K111'
INTERMEDIATE
NODE112
KEY K112
RNC
11
ROOT
NODE
KEY Ko'
SGSN1
GGSN
SGSN2
BM_SC
LEAF NODE UE1121
KEY K1121
LEAF NODE UE1122
KEY K1122
LEAF NODE UE1123
KEY K1123
LEAF NODE UE1131
KEY K1131
LEAF NODE UE1132
KEY K1132
LEAF NODE UE1133
KEY K1133
RNC
12
LEAF NODE UE...
KEY ...
LEAF NODE UE...
KEY ...
LEAF NODE UE...
KEY ...
RNC
21
LEAF NODE UE...
KEY ...
LEAF NODE UE...
KEY ...
LEAF NODE UE...
KEY ...
GGSN
SGSN
RNC
LEAG ONDE UE...
KEY ...
LEAG ONDE UE...
KEY ...
LEAG ONDE UE...
KEY ...
LOGICAL NETWORK DEVICE CONNECTION
LOGICAL KEY NODE CONNECTION

FIG.14

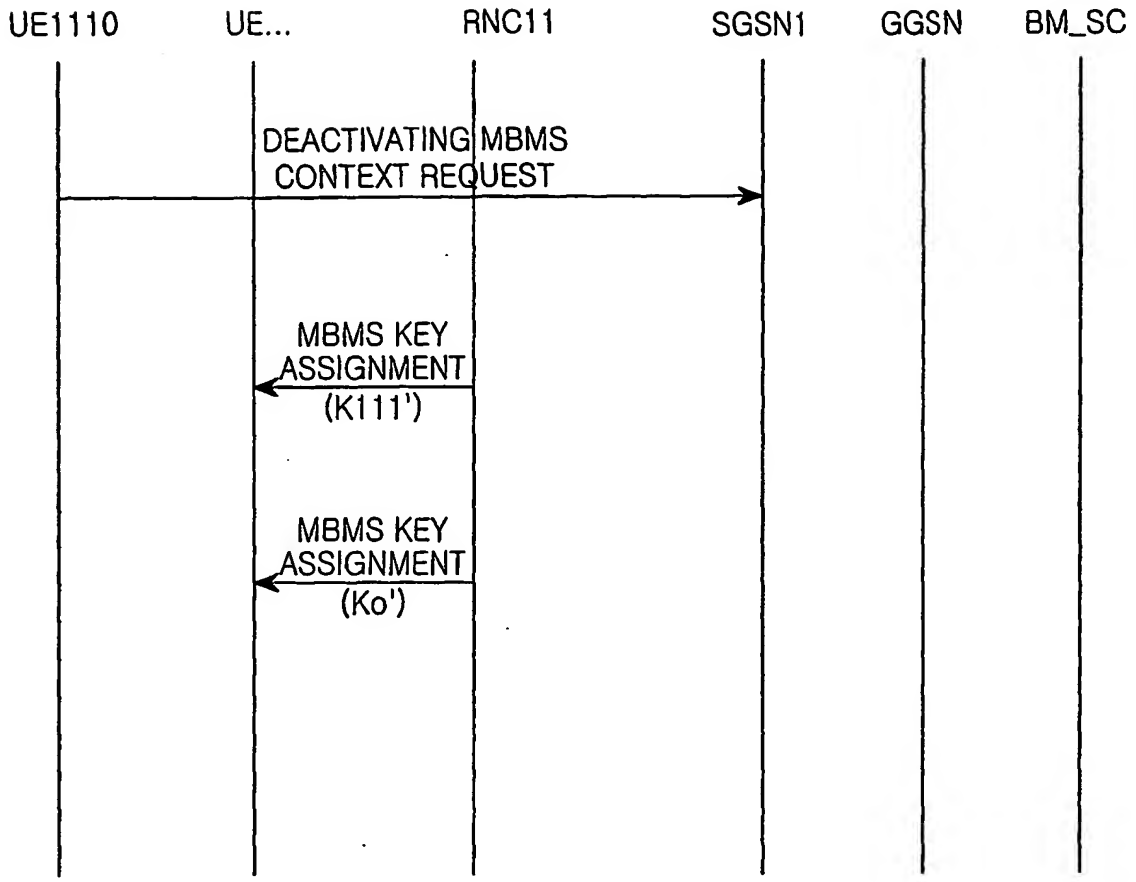
UE1110
UE...
RNC11
SGSN1
GGSN
BM_SC
DEACTIVATING MBMS CONTEXT REQUEST
MBMS KEY ASSIGNMENT (K111')
MBMS KEY ASSIGNMENT (Ko')

FIG.15

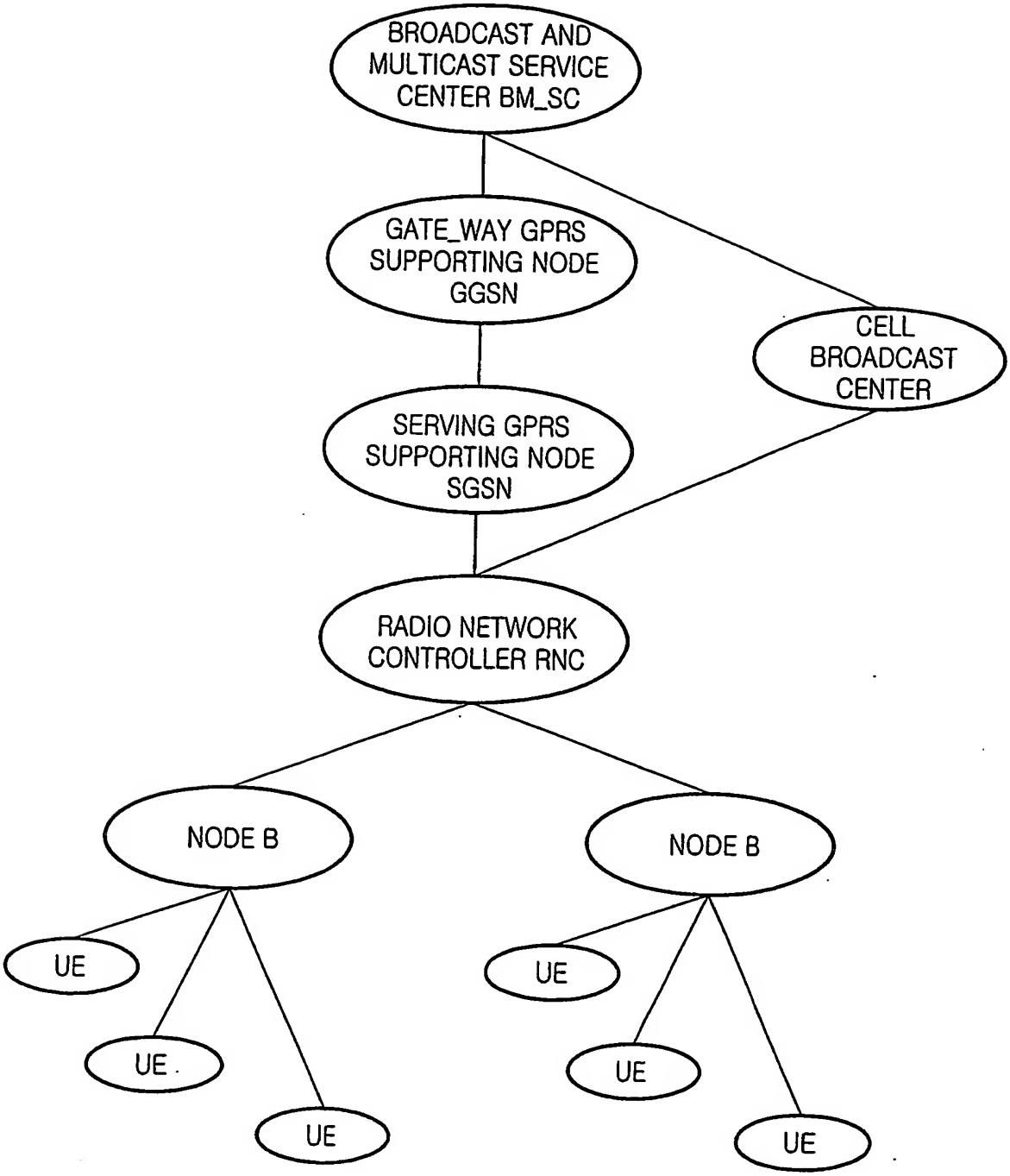
BROADCAST AND MULTICAST SERVICE CENTER BM_SC
GATE_WAY GPRS SUPPORTING NODE GGSN
CELL BROADCAST CENTER
SERVING GPRS SUPPORTING NODE SGSN
RADIO NETWORK CONTROLLER RNC
NODE B
NODE B
UE
UE
UE
UE
UE
UE

FIG.16

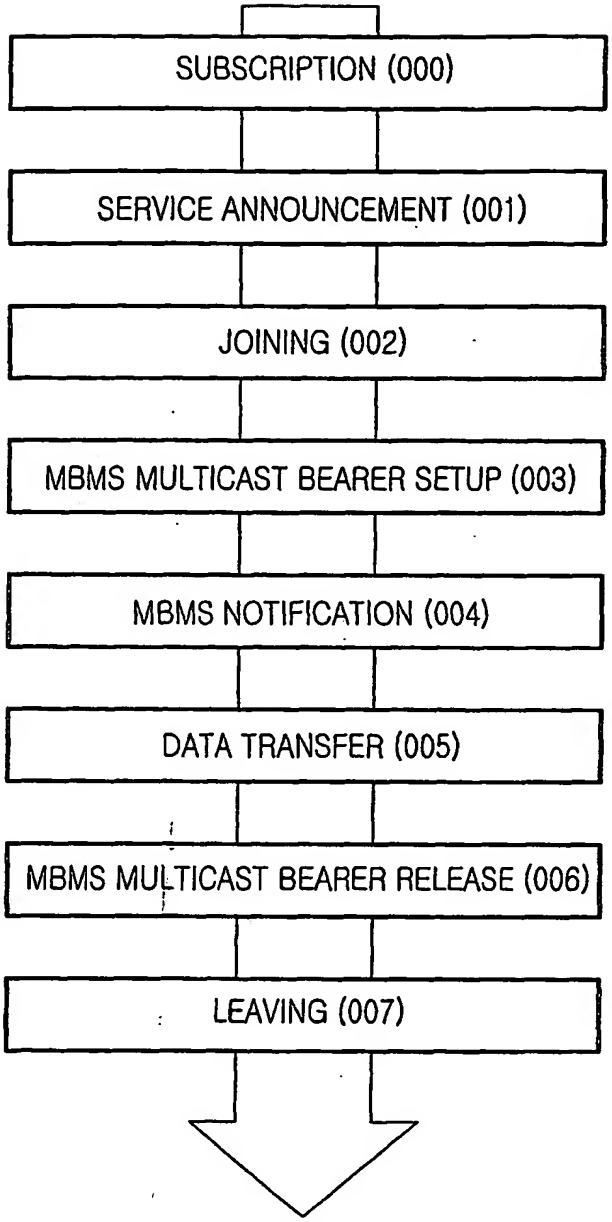
SUBSCRIPTION (000)
SERVICE ANNOUNCEMENT (001)
JOINING (002)
MBMS MULTICAST BEARER SETUP (003)
MBMS NOTIFICATION (004)
DATA TRANSFER (005)
MBMS MULTICAST BEARER RELEASE (006)
LEAVING (007)

FIG.17